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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO:
10/711,023	08/18/2004	Evan G. Colgan	FIS920040078US1	5022

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EXAMINER

MANDALA, VICTOR A

ART UNIT PAPER NUMBER

2826

DATE MAILED: 02/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/711,023

Applicant(s)

COLGAN ET AL.

Examiner

Victor A. Mandala Jr.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 7,8,17 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-16,19 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/18/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Claims 7, 8, 17, & 18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/20/05.

Double Patenting

2. Claims 12-16, 19, and 20 are objected to under 37 CFR 1.75 as being a substantial duplicate of claims 2-6, 9, and 10. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the heat sink attached to the heat spreader must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure

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is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1, 4, 9, 11, 14 & 19 are rejected under 35 U.S.C. 102(a) as being anticipated by Japanese Patent No. 2004-172489 Naoto, (Japanese Patent Office Computer Translation).

4. Referring to claim 1, an electronic packaging structure comprising: a chip carrier, (Figure 5 #1); at least two semiconductor devices, (Figure 5 #6 & 7), attached to said chip carrier, (Figure 5 #1), where at least one of said at least two semiconductor devices, (Figure 5 #6 & 7), has a different thickness; a heat spreader, (Figure 5 #13), having a substantially planar surface in thermal contact with said at least two semiconductor

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devices, (Figure 5 #6 & 7); and a thermal adhesive layer, (Figure 5 #18), in contact with said heat spreader, (Figure 5 #13), and with said at least two semiconductor devices, (Figure 5 #6 & 7), whereby a semiconductor device, (Figure 5 #6), requiring a lower thermal resistance has a thinner thermal adhesive layer, (Figure 5 #18), than a semiconductor device, (Figure 5 #7), which can tolerate a higher thermal resistance.

5. Referring to claim 4, a packaging structure of claim 1 wherein said semiconductor devices are selected from the group consisting of integrated circuit chips, capacitors, resistors and thermistors, (Figure 5 #6 & 7).

6. Referring to claim 9, a packaging structure of claim 1 wherein said heat spreader is the package lid, (Figure 5 #13).

7. Referring to claim 14, a method of claim 1 wherein said semiconductor devices are selected from the group consisting of integrated circuit chips, capacitors, resistors and thermistors, (Figure 5 #6 & 7).

8. Referring to claim 19, a method of claim 1 wherein said heat spreader is the package lid, (Figure 5 #13).

9. Referring to claim 11, a method for cooling multiple semiconductor devices, (Figure 5 #6 & 7), with different cooling requirements on a common chip carrier, (Figure 5 #1), with a common lid or heat spreader, (Figure 5 #13), comprising the steps of: providing a chip carrier, (Figure 5 #1); attaching at east two semiconductor devices, (Figure 5 #6 & 7), to said chip carrier, (Figure 5 #1), where at least one of said at least two semiconductor devices, (Figure 5 #6 & 7), has a different thickness; placing a heat spreader, (Figure 5 #13), having a substantially planar surface in thermal contact with said at least two semiconductor devices, (Figure 5 #6 & 7); and placing a thermal

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adhesive layer, (Figure 5 #18), in contact with said heat spreader, (Figure 5 #13), and with said at least two semiconductor devices, (Figure 5 #6 & 7), whereby a semiconductor device, (Figure 5 #6), requiring a lower thermal resistance has a thinner thermal adhesive layer, (Figure 5 #18), than a semiconductor device, (Figure 5 #7), which can tolerate a higher thermal resistance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 12, & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. 2004-172489 Naoto, (Japanese Patent Office Computer Translation) in view of U.S. Patent No. 6,850,411 Patel.

10. Referring to claim 2, a packaging structure of claim 1 wherein said chip carrier, (Naoto Figure 5 #1 and Patel Figure 1 #12), is a ceramic chip carrier, (Patel Col. 4 Lines 25-28 and See * below).

* Naoto discloses the claimed invention except for the chip carrier being made out of a material selected from the group consisting of ceramic or organic materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Patel with the teachings of Naoto to make the chip carrier out of a material selected from the group consisting of ceramic or organic materials because these materials have high thermal conductive properties and high stress

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tolerances, and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

11. Referring to claim 3, a packaging structure of claim 1 wherein said chip carrier, (Naoto Figure 5 #1 and Patel Figure 1 #12), is an organic chip carrier, (Patel Col. 4 Lines 25-28 and See * above).

12. Referring to claim 12, a method of claim 1 wherein said chip carrier, (Naoto Figure 5 #1 and Patel Figure 1 #12), is a ceramic chip carrier, (Patel Col. 4 Lines 25-28 and See * above).

13. Referring to claim 13, a method of claim 1 wherein said chip carrier, (Naoto Figure 5 #1 and Patel Figure 1 #12), is an organic chip carrier, (Patel Col. 4 Lines 25-28 and See * above).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 10, 15, & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. 2004-172489 Naoto, (Japanese Patent Office Computer Translation) in view of U.S. Patent No. 6,292,369 Daves et al.

14. Referring to claim 5, a packaging structure of claim 1 wherein said heat spreader, (Naoto Figure 5 #13 and Daves et al. Figure 7 #104), is comprised of material selected

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from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials, (Daves et al. Col. 5 Lines 65-67 and see ** below).

** Naoto discloses the claimed invention except for the heat spreader being made out of a material selected from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Daves et al. with the teachings of Naoto to make the heat spreader out of a material selected from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials because these materials have high thermal conductive properties and high stress tolerances, and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

15. Referring to claim 10, a packaging structure of claim 1 further comprising a heat sink, (Daves et al. Figure 7 #106), in thermal contact with said heat spreader, (Naoto Figure 5 #13 and Daves et al. Figure 7 #104 and See *** below).

*** Naoto is silent on the usage of a heat sink being attached to the heat spreader, but Daves et al. does. It would have been obvious to one having skill in the art at the time the invention was made to attach a heat sink to the heat spreader because the purpose of a heat spreader is to evenly spread heat through out itself and dissipate heat from the device that it is attached to, where the addition of a heat sink allows for the heat that is evenly dispersed within the heat spreader to dissipate to the heat sink allowing for the device to operate at lowered operational temperatures, operate more efficiently, and have higher switching speeds.

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16. Referring to claim 15, a method of claim 1 wherein said heat spreader, (Naoto Figure 5 #13 and Daves et al. Figure 7 #104), is comprised of material selected from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials, (Daves et al. Col. 5 Lines 65-67 and see ** below).

** Naoto discloses the claimed invention except for the heat spreader being made out of a material selected from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Daves et al. with the teachings of Naoto to make the heat spreader out of a material selected from the group consisting of diamond, Si, SiC, Mo, ceramic and composites containing these materials because these materials have high thermal conductive properties and high stress tolerances, and since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

17. Referring to claim 20, a method of claim 1 further comprising the step of attaching a heat sink, (Daves et al. Figure 7 #106), in thermal contact with said heat spreader, (Naoto Figure 5 #13 and Daves et al. Figure 7 #104 and See *** below).

*** Naoto is silent on the usage of a heat sink being attached to the heat spreader, but Daves et al. does. It would have been obvious to one having skill in the art at the time the invention was made to attach a heat sink to the heat spreader because the purpose of a heat spreader is to evenly spread heat through out itself and dissipate heat from the device that it is attached to, where the addition of a heat sink allows for the heat that is evenly dispersed within the heat spreader to dissipate to the heat sink allowing for the device to

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operate at lowered operational temperatures, operate more efficiently, and have higher switching speeds.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 & 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. 2004-172489 Naoto, (Japanese Patent Office Computer Translation) in view of U.S. Patent No. 5,098,609 Iruvanti et al.

18. Referring to claim 6, a packaging structure of claim 1 wherein said thermal adhesive layer, (Naoto Figure 5 #18), is comprised of a material selected from the group consisting of Ag filled epoxy, filled thermoplastic, filled polymer, filled polymer adhesive, metal and solder, (See */* below)..

/ Naoto discloses the claimed invention except for the thermal adhesive layer being made out of a material selected from the group consisting of Ag filled epoxy, filled thermoplastic, filled polymer, filled polymer adhesive, metal and solder. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Iruvanti et al. with the teachings of Naoto to make the thermal adhesive layer out of a material selected from the group consisting of Ag filled epoxy, filled thermoplastic, filled polymer, filled polymer adhesive, metal and solder because these materials have high thermal conductive properties and high stress tolerances, and

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since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

19. Referring to claim 16, a method of claim 1 wherein said thermal adhesive layer, (Naoto Figure 5 #18), is comprised of a material selected from the group consisting of Ag filled epoxy, filled thermoplastic, filled polymer, filled polymer adhesive, metal and solder, (See */* above).

Conclusion

NATHAN J. FLYNN
SUPERVISOR/PATENT EXAMINER
TECHNOLOGY CENTER 2800

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor A. Mandala Jr. whose telephone number is (571) 272-1918. The examiner can normally be reached on Monday through Thursday from 8am till 6pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on (571) 272-1915. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

VAMJ
1/9/06